

Can an App Close the Literacy Gap?

A Randomized Study of the Efficacy of HOMER

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At a moment in history when teachers, parents, policymakers and consumers are questioning the benefits and perils of digital media use among young children, this study set out to examine the efficacy of HOMER, a digital application for iPad designed to improve school readiness skills through children's early literacy development. Our goal was to better understand how a carefully targeted application with an evidence-based instructional design could help to improve children's skills and potentially close the gap for low-income children.

The study was conducted in 7 Head Start classrooms with a sample of 82 children. Children were randomly assigned to treatment and control groups. The treatment group used 6 levels of HOMER's literacy program for 15 minutes per day for 6 weeks. The control group used a math app during the same period and duration. The Test of Preschool Early Literacy (TOPEL) and other assessments were administered before and after the study to all children. Moderators ensured that children were on task, but teachers offered no instruction. In sub-tests of the TOPEL, treatment students showed statistically significant gains from pre-to-post test in phonological awareness, print knowledge and letter sounds.

Figure 1 below shows student performance on the test of phonological awareness before using HOMER and after. Note that students nearly doubled scores from pre to post-test, increasing pre-test scores by 74%.

Figure 2 below shows shows gains made by treatment students from pre-test to post-test on an assessment of their print knowledge, their understanding of the nature and uses of print.

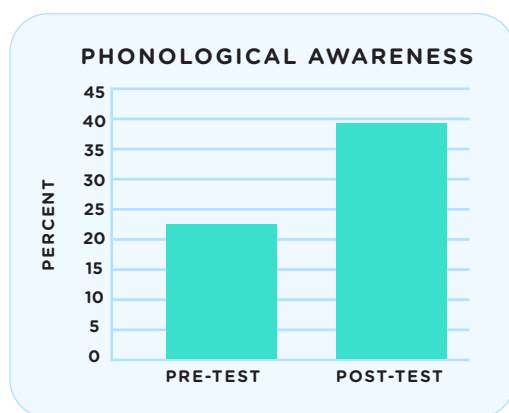


Fig. 1

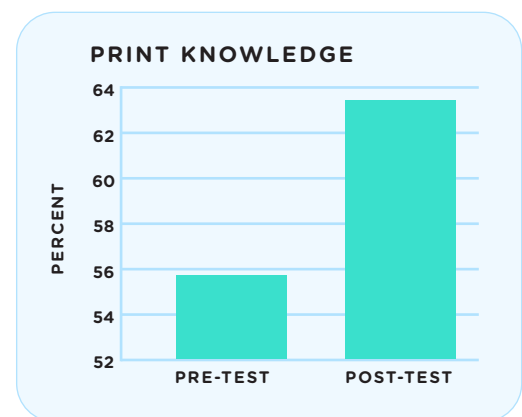


Fig. 2

On all skills sub-tests, the students in the control and treatment groups began the study with no significant differences in school readiness skills with the exception of phonological awareness, in which control students scored significantly higher on pre-tests.

At the end of the study, treatment group scores exceeded those of the control group on those skills most highly correlated with school readiness.

Figure 3 at right displays an interesting pattern. Initial differences between the treatment and control groups at pre-test were significant (Table 2), indicating that the control group was superior in the skill prior to the start of the trial. However, over the summer and despite continuing enrollment in preschool, their scores declined significantly. At the same time, children in the treatment group's scores on phonological awareness grew significantly, overtaking the initial differences between groups. These differences between groups at the end of the trial were statistically significant. At post-test, children in the treatment group were beginning to approach the norm on this important skill.

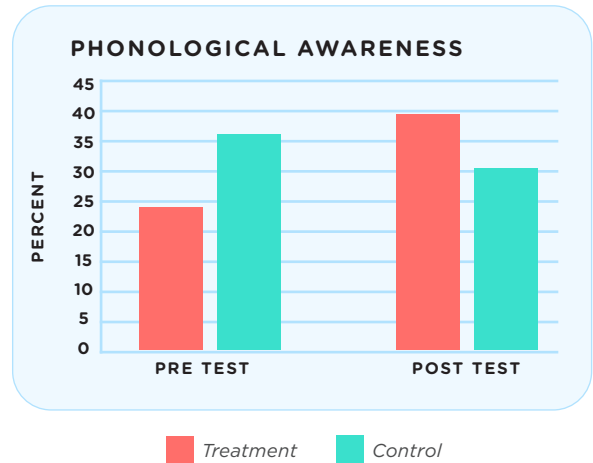


Fig. 3

Summary:

This study indicated measurable effects for children's growth in phonological awareness and in developing an understanding of the speech-to-print connections in early literacy development. Children in the treatment group exceeded those in the control condition in three areas in particular: print knowledge, phonological awareness, and letter sounds. For the treatment group specifically, children made statistically significant gains in all skills measured with the exception of the identification of upper case letters. These results indicate that HOMER significantly improved children's school readiness skills.

PRINT KNOWLEDGE

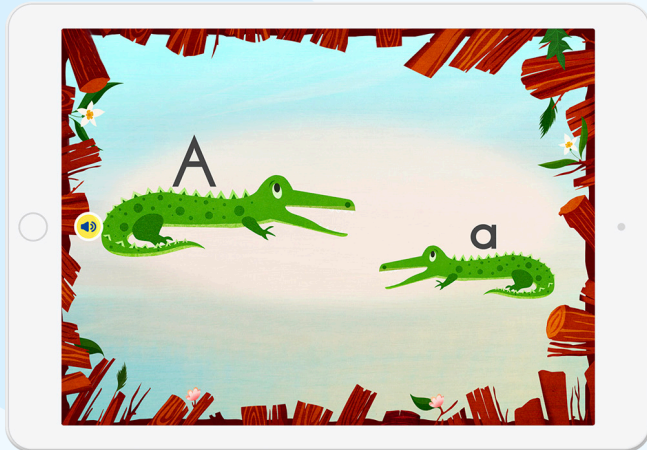


Fig. 4

PHONOLOGICAL AWARENESS

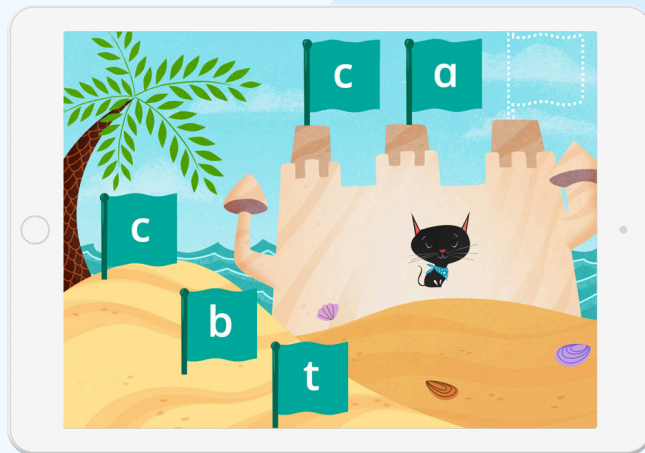


Fig. 5

LETTER SOUNDS



Fig. 6

Figures 4-6 illustrate the visual treatment of HOMER's instructional design.